REMARKS/ARGUMENTS

Claims 1-6, 10-19, 41-46, and 48-59 are presently pending in the application. Claims 5-6, 41-44, and 48-50 have been amended for purposes of clarification.

During a telephonic interview between the undersigned attorney and the Examiner on June 14, 2004, the various rejections of the claims were discussed with respect to the present invention and the cited prior art references. A summary of the telephonic interview is presented in the remarks below.

On page 4 of the Office Action, the Examiner states that Abe et al. does not teach control information that specifies a limit on the operation, excess information rate value, and committed burst size value of a network element. Additionally, the Examiner states on page 4 that Hanson teaches control information that specifies a limit on the operation, excess information rate value, and committed burst size value of a network element, and that it would be obvious to one of ordinary skill in the art to add a control information that specifies a limit on the operation, excess information rate value and committed burst size value of a network elements of Hanson to the system of Abe to improve the system handling different customers requirements. Applicant respectfully disagrees.

In general, the primary reference Abe discloses a system having a network management equipment (200 of Fig. 1) which receives bandwidth values for routes connected to other network elements EA~ED (Fig. 1). The received bandwidth information is then used to calculate an available bandwidth for such routes, and this calculated available bandwidth information is sent to the network elements EA~ED so they can determine themselves which routes to use based on the provided available bandwidths for such routes. See Column 7, lines 32-60 and Column 9, lines 1-12.

Hanson is generally directed to a traffic management and congestion control technique for packet-based networks. Referring to Fig. 1 of Hanson, a virtual connection is established between a source node (102a) and a destination node (102b), which may traverse one or more intermediate nodes (105). During the flow of packets along the virtual connection in a forward direction (from the source node (102a) to the destination node (102b)) each node measures the utilization of critical resources (CUF). This utilization information is inserted into return packets flowing in the backward (return) direction, from the destination node (102b) to the source node (102b). CUF is indicative of the maximum utilization of any resource in the virtual connection forward path. If the network utilization information indicates that the resources of a virtual connection are under-utilized, the submission rate of packets onto the virtual connection is

increased. However, if the network utilization information indicates that the resources of the virtual connection are over-utilized, the submission rate of packets onto the network at the source node is reduced. (Abstract)

From this description it is clear that Hanson teaches a technique for efficiently utilizing available resources of a virtual connection. For example, as stated in the abstract and columns 2-3 of Hanson, if the network resource utilization information indicates that the resources of a virtual connection are under-utilized, the submission rate of packets onto the virtual connection is increased. However, if the network resource utilization information indicates that the resources of the virtual connection are over-utilized, the submission rate of packets onto the network at the source node is reduced. There is no teaching or suggestion in Hanson for dynamically modifying or reprovisioning the allocated resources of the virtual connection. In this way, Hanson teaches away from the technique of the present invention since the traffic management and congestion control technique described in Hanson is directed to a solution whereby utilization of a fixed set of resources of a virtual connection is either increased or decreased, depending upon current congestion and conditions. In contrast, the technique of the present invention describes a technique for reducing network traffic congestion on a virtual connection, for example, by dynamically modifying or reprovisioning the allocated resources of the virtual connection.

For example, page 10, lines 1-21 of the present application illustrate by way of example several limitations of conventional data networks which may occur when insufficient bandwidth has been allocated or provisioned on a virtual circuit to support, for example, high-quality video/voice conferencing applications. In this example it is assumed that the current CIR and EIR bandwidth values for virtual circuit 150 (FIGURE 1) are insufficient for supporting high quality video/voice applications, resulting in the client 102 receiving poor quality video images and voice information from server 114 because the resources currently allocated for the virtual connection are insufficient to support the high bandwidth requirements of the voice/video applications.

If this example were to be applied to the system of Hanson, the system of Hanson would recognize that the resources of the virtual connection are being over-utilized, and would therefore respond by attempting to reduce the submission rates of packets on the virtual connection. In contrast, in order to provide high-quality video/voice conferencing, the technique of the present invention may respond by attempting to automatically and dynamically adjust the current CIR and EIR bandwidth values of the virtual connection to accommodate higher bandwidth throughput.

The Examiner cites Hanson column 8, lines 1-67, in support of the assertion that Hanson teaches specifying a limit on the operation, excess information rate value, and committed burst size value of a network element. However, the EIR and CIR values described in Hanson relate merely to static values which are used to provision the fixed resources of the virtual connection. Hansen fails to teach or suggest dynamically adjusting the CIR and EIR parameters associated with the virtual connection. Hansen teaches that such parameters are provided once during a single event, at subscription, and are not thereafter adjusted.

As noted previously, the Examiner asserts that it would be obvious to one of ordinary skill in the art to add a control information that specifies a limit on the operation, excess information rate value and committed burst size value of a network elements of Hanson to the system of Abe to improve the system handling different customers requirements. However, there is no teaching or suggestion in either Abe or Hanson which suggests the motivation for combining such references as asserted by the Examiner, namely to improve the system handling different customers requirements. Such motivation to modify the prior art must flow from some teaching in the art that suggests the desirability or incentive to make the modification needed to arrive at the claimed invention. *In re Fine*, 837 F.2d 1071, 1074, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988), *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984) ("The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification."). In the present case, the Examiner asserts that the motivation for combining Abe and Hanson is to improve the system handling different customers requirements. Not only is there no teaching or suggestion in Abe or Hanson for such a motivation, but it is respectfully submitted that such motivation is so broad and non-specific that it could be used to justify the combination of any desired references relating to customer-based technology. Accordingly, it is believed that such motivation represents impermissible hindsight reconstruction on the part of the Examiner in justifying the combination of Abe and Hanson.

Additionally, even if there were a proper basis for combining the teachings of Abe and Hanson, the combination of such teachings would not result in the invention as claimed, for example, in claims 5-6, 41-44, and 48-50 of the present application since neither Abe nor Hanson teaches or suggest the desirability to dynamically modify, for example, the EIR and/or CIR parameters of one or more network elements (associated with a given virtual connection) by providing updated control information to the network elements which includes adjustment amounts relating to such parameters. More specifically, Abe teaches a network feedback loop for providing available bandwidth information to network nodes, which is stored in the routing

tables of the network nodes. Hansen teaches the use of static CIR and EIR parameters for provisioning a virtual connection with fixed resources. Although the Examiner suggest that it would be desirable to combine the teachings of Hanson and Abe, there is no teaching or suggestion of any mechanism in Abe or Hanson which would allow the nodes of Abe to receive updated control information which includes, for example, adjustment amounts relating to the EIR and/or CIR parameters associated with a virtual connection. Moreover, even if such information could be provided to the nodes of Abe, there is no teaching or suggestion in either Abe or Hanson for any mechanism by which the network node could implement dynamic modification of the EIR and/or CIR parameters associated with the virtual connection. Thus, even if one were to combine the teachings of Abe and Hanson, the resulting system would not include all the features and benefits of the present claimed invention, as defined, for example, in claims 5-6, 41-44, and 48-50 of the present application. Accordingly, it is believed that claims 5-6, 41-44, and 48-50 are allowable for at least these reasons.

On page 5 of the Office Action, the Examiner asserts that Abe teaches calculating updated control information (available bandwidth) and providing it to network elements. The Examiner further asserts that this control information inherently includes the bandwidth adjustment amount to change the network element's bandwidth to a desired value, citing Abe, column 7, lines 51-60 in support of such assertions. Application respectfully disagrees. Column 7, lines 51-60 of Abe state:

> This bandwidth information is distributed from the network management equipment 200 to each edge node. More specifically, the information is distributed to the routing table 1302 via the network management data storage device 401, data writing module 404, and transmit and receive module 408 shown in FIG. 4, the node controller 40 shown in FIG. 12, and the line controller shown in FIG. 13 (step 2105). The bandwidth information is then stored in the routing table 1302 of each edge node.

Applicant respectfully traverses the Examiner's assertion that the updated bandwidth information provided to the network elements (in Abe) inherently includes a bandwidth adjustment amount to change the network element's bandwidth to the desired value. As stated in Column 7, lines 51-60 of Abe, the information which is provided from the network management equipment 200 to each edge node is the available bandwidth information which is to be stored in the routing table of the network node, and used by the network nodes to perform routing decisions based upon current traffic (e.g., available bandwidth) conditions in the network. The

available bandwidth information provided by the network management equipment 200 merely provides the network element with information relating to available bandwidth on particular links. There is no teaching or suggestion in Abe that the bandwidth information includes an adjustment amount to cause the network element's bandwidth to change to a desired value (as suggested by the Examiner). It is submitted that such an interpretation would be contrary to the teachings of Abe since Abe clearly teaches that the network element does not use the available bandwidth information to change its internal configuration or control parameters, but rather uses the available bandwidth information to select, for traffic routing purposes, a permanent virtual route (PVR) in the network which currently has the largest available bandwidth value. (Column 8: 15-25) Moreover, the updated bandwidth information which is provided to the network element of Abe merely provides an indication as to what resources are currently available to the network element, and does not specify an adjustment amount to a NEs control parameter, in the manner claimed. Further, Abe does not teach or suggest reprovisioning of resources of a given virtual connection. According to the technique of Abe, if a particular link of a virtual connection has low bandwidth availability, a node in the system of Abe would respond by selecting a different link with greater bandwidth availability. The node of Abe would not respond by attempting to reprovision the link to increase allowable bandwidth resources on that link. In contrast, the technique of the present invention provides a response mechanism whereby the link resources (e.g., EIR parameters, CIR parameters, etc.) of the link are automatically and dynamically adjusted to achieve dynamic reprovisioning of available bandwidth resources associated with a virtual connection.

Claim 1 of the present application is directed towards a method "for providing dynamic feedback control of network elements in a data network, the data network including a plurality of network elements, each of said network elements having a plurality operating parameters associated therewith, said operating parameters being related to at least one control parameter of said element." Claim 1 also defines the limitations of "receiving information relating to an operation of a first subset of the plurality of network elements" and "providing at least a portion of said received information to at least one analysis entity for analyzing said portion of received data and calculating updated control information based on such analysis, wherein the updated control information specifies an adjustment amount to a control parameter of the at least one network element." Claim 1 also defines "receiving the updated control information calculated by the analysis entity" and "providing the updated control information to at least one of the network elements."

In contrast to the teachings of the cited prior art references, the technique of the present invention provides for the calculation of updated control information which specifies an adjustment amount to a control parameter of a network element (NE) based on analysis of information that relates to the operation of a subset of network elements. This updated control information which specifies an adjustment amount to a control parameter of a NE is then provided to such NE. The present invention advantageously provides dynamic feedback for controlling and specifying an adjustment amount to a control parameter of a NE based on analysis of network operation. In other words, a feedback loop is provided for specifying an adjustment amount to a control parameter of the operation of each NE on the fly, as opposed to performing a pre-configuring operation in a single event without subsequent adjustment, *e.g.*, as part of a service subscription package.

The cited references Abe and Hansen both fail to disclose and suggest dynamically providing updated control information to a network element, where the updated control information specifies an adjustment amount to a control parameter of the at least NE and such updated control information is calculated based on the operation of a subset of NEs. In sum, both references fail to specify an adjustment amount to a control parameter of a NE, in the manner claimed. In contrast to specifying an adjustment amount to an NE, both references teach merely providing information on the bandwidth which is available in a subnetwork. Presumptively, even if the NE could determine its own adjustment amount based on the updated bandwidth information, such adjustment amount is in no way provided to the network element by the network management equipment 200.

Since both Abe and Hanson fail to teach or suggest providing to a network element updated control information_which specifies an adjustment amount to a control parameter of a NE that was calculated based on network operation in the manner claimed, it is respectfully submitted that claims 1, 40, 47, and 53 are patentable over Abe and Hanson. Additionally, the Examiner's rejections of the dependent claims are also respectfully traversed. However, to expedite prosecution, all of these claims will not be argued separately. Claims 2-6, 10-19, 41-46, and 48-52 and 54-59 each depend directly from independent claims 1, 40, or 47 and, therefore, are respectfully submitted to be patentable over cited art for at least the reasons set forth above with respect to claims 1, 40, and 47.

Claims 1-6, 10-19, 41-46, and 48-59 are presently pending application. Reconsideration of the rejected claims as well as an early indication of all of the presently pending claims is

earnestly solicited. The Examiner is invited to telephone the undersigned attorney in any matters remain which could benefit from such a conversation.

Respectfully submitted,
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